

REMARKS

Claims 67 through 92 are pending in the application.

In the Office Action, the Examiner has rejected all the claims under 35 U.S.C. §103 as being unpatentable over PCT publication WO 99/38185. In response to the Office Action, the Applicants traverse the Examiner's rejection of the claims.

The present invention relates to methods for transmitting ions for mass spectroscopy. The method is generally performed by an ion transmission device 14, 162 (ionguide/accelerator) which provides for the efficient transport of ions between mass spectroscopy devices. As shown in Figure 1, the mass spectroscopy devices generally include ion sources 12 and mass analyzers 16, but can also be used to interface other components such as an ion trap 156 and a detector 158 as shown in Figure 7. The transmission device 14, 162 provides for the simultaneous damping and acceleration of the ions along the entire length between the components being interfaced. The transmission device 14, 162 includes accelerator rods 20 for accelerating the ions. The combination of damping and accelerating the ions reduces the energy spread of the ions to produce a substantially continuous beam of ions.

Applicants respectfully traverse the §103 rejections and submit that 67 through 92 patentably distinguish over PCT publication WO 99/38185. In the Office Action, the Examiner has rejected all the claims under 35 U.S.C. §103 as being unpatentable over PCT publication WO 99/38185 ("PCT publication"). The Examiner notes that PCT publication indicates at Page 8, Line 2 through 5 states that:

“[a] potential difference can be provided between two adjacent rod sets sufficient to accelerate ions into the downstream rod set, to cause collisionally induced dissociation in the downstream rod set.”

While acknowledging that the "PCT publication" does not disclose or suggest performing simultaneous damping and accelerating along the entire length of the ion guide, the Examiner contends that since the "PCT publication" teaches damping and accelerating over select portions that it would be obvious that "all the portions can be combined to achieve the damping and accelerating over the entire portion".

1. Prior Art

Applicants have carefully considered the Examiner's contentions and the prior art cited in the Office Action. In responding to the Examiner's contentions, Applicants are submitting herewith a Declaration of inventor Andrew Krutchinsky to comment on the teachings of the "PCT publication" in which he is a named co-inventor and to comment on the acceleration associated with the traditional ion guides (quadrupoles) disclosed therein.

With regard to the acceleration that the Examiner notes is associated with the rod sets disclosed in the PCT publication, those skilled in the art recognize that there are fringing fields associated with quadrupole rod sets. The fringing fields provide an acceleration to ions at the entrance and exit of the quadrupole rod set, but not along the entire length of the quadrupole rod set. In particular, it is also well known that the acceleration associated with the fringing fields at the ends of the quadrupole rod set only occurs over a length equal to about the diameter of the rods used in the quadrupole rod set. The magnitude of the acceleration over this length is not constant. In fact, the magnitude of the acceleration is greatest at the end (entrance or exit) and decreases at about an exponential rate to zero. (See paragraph 6 of Krutchinsky Declaration).

The reference to the "two adjacent rod sets" at Page 8, Line 2 through 5 of the PCT publication refers to the quadrupole rod sets 31 and 32 shown in Figure 2. The

downstream rod set 32 operates essentially as an ion guide while the upstream rod set 31 is used as a mass filter. (See PCT publication at Page 19, line 28 through Page 21, line 4)(See paragraph 5 of Krutchinsky Declaration). Mass filters such as the upstream rod set 31 generally require a substantial length for filtering ions. In particular, those skilled in the art recognize that long continuous rods offer distinct advantages over a plurality of short rods arranged end-to-end when the desired goal is to filter ions. (See paragraph 7 of Krutchinsky Declaration). The PCT publication does not disclose or suggest an accelerator rod 20 in accordance with the present invention. (See paragraph 8 of Krutchinsky Declaration).

2. Argument

Applicants respectfully note that in accordance with MPEP §2142 basic criteria must be met in order to support a *prima facie* case of obviousness. First, there must be some suggestion or motivation either in the references themselves or in the knowledge generally available to one of ordinary skill in the art to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art references when combined must teach or suggest all the claim limitations. Further, the teachings or suggestions to make the claim combination and the reasonable expectations of success must both be found in prior art, and not based on Applicants' disclosure. Applicants respectfully submit that a rejection of obviousness in compliance with MPEP §2142 has not been met.

A. INDEPENDENT CLAIMS 67 and 80, AND THOSE CLAIMS THAT DEPEND THERE FROM

In rejecting Claims 67 and 80, the Examiner contends that since the "PCT publication" teaches damping and accelerating over select portions that it would be obvious that "all the portions can be combined to achieve the damping and

accelerating over the entire portion”. As explained above, the acceleration associated with the quadrupole rod sets 31 and 32 is due to fringing fields which only provide a transient acceleration to ions at the entrance and exit of the quadrupole rod set. By their nature, fringing fields only accelerate ions through a distance equal to about the diameter of the rods. Therefore, the “portions” cannot be combined as suggested by the Examiner to perform step (c) in Claims 67 and 80 which require: “accelerating the ions along the entire length” (emphasis added) because the PCT publication does not disclose any means or method for accelerating ions within the central portion of the “length” as defined in the claims. Accordingly, for this reason alone Applicants submit that the rejections of Claims 67 and 80, and those Claims that depend there from should be withdrawn.

For the sake of argument, if we assume the Examiner was suggesting that the combination of the “portions” was to be accomplished by modifying the length of the rods for the quadrupole rod sets 31 and 32 to be less than about two times the diameter of the rod, this modification would change the principle operation of at least the upstream quadrupole 31. As noted above, the upstream rod set 31 is used as a mass filter which requires a substantial length for filtering ions. Accordingly, the shortening of the rods would not be desirable for a quadrupole rod set that is configured as a mass filter.

Accordingly, for the reasons stated above Applicants submit that the rejections of Claims 67 and 80, and those Claims that depend there from should be withdrawn.

**B. INDEPENDENT CLAIMS 80, AND THOSE CLAIMS THAT
DEPEND THERE FROM**

The PCT publication does not teach or suggest all of the limitations of Claim 80. Step (c) of Claim 80 states: “accelerating the ions along the entire length with at

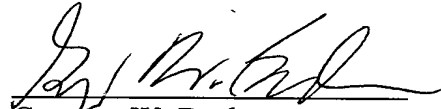
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least one accelerator rod" (emphasis added). In particular, the PCT publication does not disclose or suggest an accelerator rod 20 in accordance with the present invention. (See paragraph 8 of Krutchinsky Declaration). Accordingly, for this reason alone Applicants submit that the rejections of Claim 80, and those Claims that depend therefrom should be withdrawn.

In view of the foregoing remarks, allowance of the application with Claims 67 through 92 are respectfully solicited. If the Examiner believes that a telephonic interview would assist in moving the application toward allowance, he is respectfully invited to contact Applicant's attorney at the number listed below.

Respectfully submitted,



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